

Explicit Evidence on an Implicit Contract*

Andrew T. Young**
Department of Economics
University of Mississippi
University, MS 38677
atyoung@olemiss.edu
Tel: 662-915-5829
Fax: 662-915-6943

Daniel Levy
Department of Economics
Bar-Ilan University
Ramat Gan 52900, ISRAEL
Levyda@mail.biu.ac.il
Tel: + 972-3-531-8331
Fax: + 972-3-535-3180

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** Corresponding author.

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Abstract

We offer the first direct evidence of an implicit contract in a goods market. The evidence we offer comes from the market for Coca-Cola. We demonstrate that the Coca-Cola Company left a substantial amount of written evidence of its implicit contract with its consumers—a very *explicit* form of an implicit contract. In general, observing implicit contracts directly is difficult because of their implicit nature. In the case of Coca-Cola, however, we are able to document the Company not only *saying* that it had an important implicit contract with its consumers, but also *acting* on it. This study makes an additional and unique contribution by exploring *quality* as a margin of adjustment available to Coca-Cola. We present evidence that the implicit contract included a promise not only of a *constant nominal price* but also a *constant quality*. We document the dedication to a 6.5oz serving of the "Secret Formula." Indeed, during a period of over 70 years, we find evidence of only a single case of true quality change. By studying the margin of adjustment the Coca-Cola Company chose in response to changes in market conditions, we demonstrate that the perceived costs of breaking the implicit contract were large. In addition, we are able to offer one piece of direct evidence on the magnitude of these costs by studying the events surrounding the failed introduction of the New Coke in 1985.

Sellers . . . can influence the shopping behavior of customers by pledging continuity of an offer . . . Yesterday's offer has a strong influence on today's demand.

Arthur Okun (1981, p. 28)

Implicit contracts strike many economists . . . as quite plausible. Yet their existence is—almost by definition—not subject to objective verification, at least not from conventional data sources.

Alan Blinder, et al. (1988, p. 149)

INTRODUCTION

"Invisible handshakes," or implicit contracts, were popularized by Okun (1981) as a possible source of price rigidity. They have most often been explored in the context of wages set in labor markets (Rosen, 1994). However, implicit contracts are plausible sources of price rigidity for other goods and services as well, although there are no studies that offer direct evidence of this. This is not surprising for the reasons offered by Blinder, et al. (1988) in the opening quote. In this paper we fill this void in the literature by offering the first direct and, in fact, quite explicit evidence on the presence of an implicit contract. The evidence we offer comes from the market for Coca-Cola.

Quite possibly, the most enduring and binding invisible handshake began with a peddler of patent medicines in Atlanta, Georgia—one John Stith Pemberton. In 1886, Pemberton had an ingenious idea. Why sell 75¢ or \$1 bottles of medicine? This was a marketing strategy limited to the sick. Why not sell a single serving for 5¢? Everyone could afford an invigorating cold soft drink—Coca-Cola—for 5¢ in the heat of the US South. Looking back, it is no surprise that the nickel Coke was born. What is surprising is that it continued to exist almost until 1960; and what is more surprising is that the Coca-Cola Company left written evidence of an implicit contract with its consumers—an *explicit* implicit contract.¹ In this paper we document the existence of this implicit contract.

The Coca-Cola price rigidity is fascinating regardless of the existence of an implicit contract. Today, if we scan the economic literature on price rigidity, we find cases of rigid nominal prices for considerable periods of time. Cecchetti (1988) examines magazine prices and finds that they normally change every 3 to 6 years. Using the Stigler and Kindahl (1970) transaction data, Carlton (1986, p. 639) finds that, "It is not unusual in some industries for prices to individual buyers to remain unchanged for several years." Kashyap (1995) studies catalog prices of 12 retail goods over a 35-year period and reports that the average time between price changes is about 15 months. Blinder, et al. (1988) present

¹ When not cited due to their generality, some historical facts concerning the Coca-Cola Company are drawn from the works of Allen (1994) and Pendergrast (1993). Additional information is drawn from publications produced by the Coca-Cola Company and provided by their archives, which include *Reviewing "A Proud History" 1886 to 1925*; *Always Coca-Cola: A Quick Reference Chronology from 1886 to 1999*; *Fact Sheet: Product Pricing Structure of Coca-Cola USA*; *Fact Sheets Concerning the Nickel Price*; and *Did You Know?*

detailed survey evidence from US firms and conclude that the average lag of price adjustments following supply or demand changes is 3 months. As well, Genesove (2003) studies apartment rental prices in the US using Annual Housing Survey data and finds that, from 1947 to 1981, between 23% and 34% of the apartments had no change in nominal rent from one year to the next.²

On the other hand, the price of a serving of Coca-Cola did not adjust to supply or demand changes *for over 60 years*. The nickel Coke did not entirely disappear from US markets until 1959—*over 70 years!* The contrast is of an order of magnitude to say the least. Also, though it is only a single firm, the Coca-Cola Company is one of the most successful and recognized producers of a consumer good in the world.³ During the time period we study, the soft drink industry and the Coca-Cola Company itself were a non-negligible part of the US economy. For example, in 1945 the bottled non-alcoholic carbonated beverage industry was 0.26% of US GDP (Riley, 1942, p. 343). The Coca-Cola Company had a roughly 50 percent market share in that industry, making its own contribution an economically significant 0.13% of GDP.

In a previous paper we argue that an *explicit* contract between the Coca-Cola Company and its bottlers was an important cause of this nominal price rigidity, until the contract was voided in 1921 (Levy and Young, 2004). The nominal price of Coca-Cola syrup to bottlers was fixed by this contract. Given this, the Coca-Cola Company could only increase profits by increasing the quantity of syrup it sold to bottlers and, therefore, the Company pursued retail price maintenance. We also document that, subsequent to 1921, two technology-based factors help to explain the continuation of the nickel Coke. First, an installed base of vending machines with nickel-only capability, and the evolution of technology accommodating multiple coin types and change-making, imposed an important constraint on adjustment of the retail price. Second, at the 5¢ price, the smallest price increase compatible with the consumer using a single coin was a 100% increase to 10¢. A *monetary transaction technology* for smaller price adjustments, keeping consumer "inconvenience costs" low, was not available.⁴

In our previous paper we are not able to address the implicit contract between Coca-Cola and its consumers that we feel is important for fully explaining the nominal price rigidity; in this paper we

² Some studies document considerably higher frequencies for price changes. Bills and Klenow (2004) examine price changes for 350 categories of goods and services covering about 70 percent of US consumer spending and document that half of the price changes last less than 4.3 months.

³ According to the 2002 *Business Week* ranking, Coca-Cola is the most valuable brand in the world, ahead of Microsoft, IBM, GE, Intel, etc.

⁴ Daly (1970) documents a case where widespread consumer inconvenience costs were high. In northeastern Brazil around 1970, the population was generally poor, so a large proportion of transactions were small, making the demand for small change high. The government's inability to ensure a sufficient part of the money supply in small denominations led to unnecessarily difficult and time-consuming small transaction for the poorest of the population. Knotek (2005) provides a model of a firm that incorporates convenience into pricing decisions; simulation exercises reveal that the model can account for the dynamics of US newspaper cover prices.

focus on it. Limited evidence of implicit contracts in product markets has been documented. Kahneman, et al. (1986) provide survey evidence that the related issue of "fair" prices is important for understanding consumer demand and Blinder, et al. (1988), also using survey evidence, find that implicit contracts exist in about two thirds of the US economy. Of those two thirds, 51% of respondents believe that implicit contracts are "moderately" or "very" important in slowing down price adjustments. As well, survey evidence from UK firms lead Hall, et al. (1997, p. 5) to conclude that "long-term relationships with customers . . . reduce price flexibility." Besides survey evidence, Renner and Tyran (2003, p. 1) provide evidence from experimental markets that "mutually beneficial long-term relations frequently prevail in markets for experience goods" and that "these long-term relations . . . are prone to price stickiness." Cason and Friedman (2002) also provide experimental evidence along the same lines. Finally, Kackmeister (2004, 2005) finds that retail prices were less flexible in the US from 1889–1891 than from 1997–1999. He attributes this observation partly to "the weakening of the personal relationship between the retailer and customer in the present age" (2004, p. 16).

In general, observing implicit contracts directly is problematic because they are "tacit agreements that are not written down [and] the theory does not predict literal price rigidity, but only that prices are relatively insensitive to fluctuations in demand" (Blinder, et al, 1988, p. 152).⁵ In the case of Coca-Cola, however, we can document the Company not only *saying* that it has an important implicit contract with its consumers but also *acting* on it by adjusting quantity instead of price and thus incurring the costs of quantity adjustment. We demonstrate below that these costs were large and, therefore, the implied costs of breaking the implicit contract were also large.

This case study makes an additional and unique contribution to the study of implicit contracts by exploring *quality* as a margin of adjustment available to Coca-Cola. We present evidence that the implicit contract between the Company and its consumers included the promise not only of a constant nominal price but also a constant quality. We document the dedication to the 6.5-ounce serving and the "Secret Formula" according to which Coca-Cola syrup was manufactured. Indeed, we provide evidence of merely seven changes in the Secret Formula over the 73 year period. Moreover, we demonstrate that two of the seven changes are best viewed as *changes in the mix of substitutable inputs*; another two were adopted to provide identical quality between the bottled and fountain forms of the drink; and a remaining two changes were mandated by court decisions. Thus we document only a single case of true

⁵ Rotemberg (2004, 2005) develops the idea of a fair price in a model where consumers interpret price changes according to their fairness and react accordingly. In Ball and Romer's (2003) model, prices serve as a signal in settings with long-term relationships between consumers and producers. That is why firms allow price variability to occur through infrequent price adjustments. Bills (1989) models a customer market where customers develop an attachment to a product which they have used in past.

quality change.⁶

This paper begins by providing a narrative of the changing market conditions from 1886–1959 that were the backdrop to the nickel Coke era. Some space is then devoted to the accompanying quality rigidity, taking care to document changes in the Secret Formula and argue that all but one should not be interpreted as a change in quality. With this background established we lay out evidence of the Coca-Cola Company establishing, recognizing, and acting upon an implicit contract. Subsequently, we supplement the largely descriptive evidence of the Company's perception of the importance of the implicit contract by providing evidence of large costs of adjusting quantity. Quantity is the margin along which adjustment *did* occur. Quantity adjustments incurred imply the lower bound on perceived costs of adjusting price and quality. However, these perceived costs include costs other than those associated with the implicit contract, e.g. the costs of replacing and/or adapting an installed base on vending machines. We conclude the paper by documenting the explicit negative reaction incurred by the Coca-Cola Company when it decided to break the quality "clause" of the implicit contract with the introduction of New Coke in 1985.

RELEVANT CHANGES IN MARKET CONDITIONS: 1886–1959

The first Coca-Cola was served in 1886 at W.E. Venable's fountain in Atlanta for 5¢. The last of the 5¢ Cokes disappeared from US markets in 1959. In the extreme, even such a long case of nominal price rigidity would be uninteresting if market conditions did not change during that time and/or other prices were stable. In actuality, the time period witnessed numerous, large shocks to both the supply and demand in relevant markets. Also, 1886 to 1959 was not a period when prices in general simply did not change much.

Figure 1 demonstrates that the prices of other common consumer goods fluctuated considerably from 1886 to 1959. Furthermore, beginning in the mid-1940s inflation became a powerful factor (**Figure 2**). By 1950 the contrast between the trend in prices and Coca-Cola's price was even noted by the US Congress. The November 6, 1950 issue of *Time* reported that, "While most of the Washington politicians were loudly talking of holding the line on prices, the Senate's Small Business Committee found something too cheap. A 5¢ bottle of Coca-Cola was underpriced [*sic*]." (*Time*, 1950a, p. 99). The Committee's recommendation: a 100 percent price increase to 10¢.

Besides the two world wars, the Great Depression, and the general upward trend in prices, numerous supply and demand shocks occurred in specific markets relevant to soft drink production and

⁶ Perhaps most importantly, we find no evidence of the public perceiving any quality change in any of these Secret Formula

sale. In 1898 a (Spanish-American) war tax on proprietary medicines was instituted and the IRS declared the Coca-Cola Company liable for 1/8¢ on every nickel drink (Riley, 1942, p. 26).⁷ The Company sued the government and eventually won in 1902, but incurred the legal expenses and paid taxes of \$29,502 (\$567,346 in 1992 \$s).⁸

In 1899, the Coca-Cola Company signed a contract granting bottling rights for most of the continental US to two Tennessee lawyers, Franklin Thomas and Joseph Whitehead.⁹ This began a trend in sales relatively away from the fountain and towards bottles. (By 1928 sales of bottles surpassed fountain sales.) Furthermore, Thomas and Whitehead had contracted the right to buy syrup from the Company at 92¢ per gallon *in perpetuity*.^{10, 11}

The original bottling company formed by Thomas and Whitehead would split in 1900 into two regional "parent bottlers" (serving the Northern and Southern states respectively) that began licensing bottling rights to smaller bottlers, which numbered 397 by 1909. Soon the Coca-Cola Company was shipping syrup directly to the bottlers, bypassing the parent bottlers. As Allen (1994, p. 109) notes:

The parent companies were left without a clearly defined role. Syrup was shipped . . . directly to actual bottlers, so that parent bottlers did not even act as genuine middlemen. They simply sat back and took a royalty on every gallon, even though they never handled a drop. The parents paid Coca-Cola 92 cents a gallon for syrup, then turned around and "resold" it to the actual bottlers at a generous markup, usually \$1.20 a gallon. It was all done on paper.

Again, there was no specified time or way for the Company to terminate this arrangement.

The contract between the parent bottlers and the Coca-Cola Company was amended early on in 1901. As related by Pendergrast (1993), the parent bottlers had been demanding half of the bottlers'

change episodes.

⁷ That Coca-Cola was deemed a patent medicine is not surprising. That very year advertisements included: "relieve[s] headache immediately." *Atlanta Police Department Bulletin*, 1898. Another ad from the time period proclaimed, "The Wonderful NERVE AND BRAIN TONIC AND Remarkable Therapeutic Agent" Advertising Copy Collection, 0009 ARS.

⁸ *Rucker v. The Coca-Cola Company*. Rucker was the Collector of Internal Revenue. For perspective, the net worth of the Company in 1902 was \$492,723 and expenditures on merchandise for making syrup was \$293, 347 (both in 1992 \$s).

⁹ Though it is not clear when Coca-Cola was first bottled, the first entrepreneur to make lasting enterprise out of it was Joseph A. Biedenharn in 1894 in Mississippi. Biedenharn would later recall that soda water bottlers at the time "didn't want to bother with [Coca-Cola]; besides, they said, the price for Coca-Cola was *too high*" (Tedlow, 1990, p.41).

¹⁰ Then Coca-Cola Company president, Asa Candler, did not believe bottling Coca-Cola would be profitable. He recalled telling Thomas and Whitehead, "[W]e have neither the money, the brains, nor the time to embark in the bottling business." *The Coca-Cola Bottling Company v. The Coca-Cola Company*, a & b. These cases represent subsequent legal battles over the perpetual nature of the contract. Candler swore under oath that he never intended the contract to be permanent.

¹¹ A 1951 *Fortune* article hazarded an explanation of a perpetual arrangement: "Parents like Coke have no direct control over their bottlers except for control over sanitary and quality standards; they can't get bottlers without giving them franchises in perpetuity, because a man won't put his money up unless he has the feeling that it all belongs to him and no one can take it." This makes sense assuming that bottling equipment was expensive and did not translate well into other productive services

profits. Bottlers felt that this would bankrupt them and the parent bottlers realized that they had a point. Also, at the 92¢ price, the Company was having difficulties with excess demand from bottlers. Furthermore, the Company had been supplying free advertising to bottlers, a situation that deteriorated into a tragedy of the commons. The result was an undated amendment to the original contract in which the Company agreed to sell syrup to the parent bottlers at 90¢ per gallon plus 10¢ per gallon for advertising materials. (The cost of the advertising materials was then passed on to the bottlers.) Also, the parent bottlers began taking a straight 6¢ per 24 bottle case royalty from bottlers. This arrangement would not change for nearly 20 years.

A flood of legal costs arose for the Coca-Cola Company following the passage of the Pure Food and Drugs Act (PFDA) in 1906. In 1891 the Georgia State Board of Pharmacy had declared that a detectable amount of cocaine was in Coca-Cola. Both before and after that declaration, the Company had attempted to rid its soft drink of cocaine while still including extract from the coca leaf.¹² However, the residual association of Coca-Cola with cocaine – along with the caffeine content – resulted in a prolonged investigation of the Company by Dr. Harvey Wiley, chief chemist of the US Department of Agriculture. One result of this investigation was the banning of Coca-Cola at canteen and post exchanges by the US War Department in the Spring of 1907 through the Fall.¹³ Then, in October 1909, Wiley seized 40 barrels and 20 kegs of Coca-Cola syrup. That same year, the American Bottlers' Protective Association (APBA), a trade association for the bottlers of carbonated beverages, passed a resolution opposing the sale of any soft drinks containing extracts of coca, kola or caffeine (Riley, 1942, p. 35). By 1911, the Company was charged with violation of the PFDA for its caffeine content and misbranding.¹⁴ In court, the initial result would be a directed verdict in favor of the Company. By 1917 the Department of Agriculture had worked the case through multiple appeals. The Company pleaded no contest and agreed to decrease the syrup caffeine content by 50 percent while doubling the amount of (de-cocainized) coca leaf and kola nut. The Coca-Cola Company had spent over \$250,000 on the case

besides soft drink bottling, and the profitability of the operation was specific to Coca-Cola's reputation. However, it is not clear that it is an explanation of a perpetual contract *with a constant syrup price* (Fortune, 1951).

¹² The Coca-Cola Company feared that protection of the Coca-Cola trademark would be threatened by removing one of the namesake ingredients entirely. This would become a non-issue in 1920 when the US Supreme Court declared, in an opinion written by Justice Oliver Wendell Holmes, Jr. for a trademark infringement case against a soft drink named "Koke," that Coca-Cola was "a single thing coming from a single source and well known to the community. . . . [T]he drink characterizes the name as much as the name the drink." *The Coca-Cola Company v. Koke Company of America*.

¹³ The ban was actually the result of a peripheral revelation of the scrutiny: minute alcohol content. Young (1983, p. 7) explained that, "In the preparation of Coca-Cola syrup the essence of two ingredients was extracted in wine or in grain alcohol, and a minute amount of this alcohol found its way into the finished product." This was particularly damaging to a company that advertised itself as "a harmless temperance beverage" that had "caused thousands of young men to give up the habit of drinking beer and other intoxicating liquors" (p. 7).

¹⁴ Paradoxically, the use of the coca bean as part of the Coca-Cola name led the Department of Agriculture to claim that the Company was guilty of misbranding for *not containing cocaine!* (Young, 1983, p. 12).

(\$2.8 million in 1992 \$s) (Pendergrast, 1993, p. 124).¹⁵

The Coca-Cola Company received some cost relief in 1913 when the tariff on Cuban sugar was reduced from 1.3840¢ per pound to 1.0048¢ (riley, 1942, p. 44). However, the relief was short-lived. In 1917, previous to the US declaration of war on Germany, sugar rationing was instituted. In May of that year, sugar sold for 8¢ per lb, up from an average of 5¢ per lb that had held over many previous years (Pendergrast, 1993, p. 129). Then, effective February 1919, a 10 percent tax on soft drink soda was imposed (Riley, 1944, p. 73). Around the same time, the Company experienced shortages of caffeine and caramel. Furthermore, the Company had to deal with the outflow of consumers during WWI as well as the postwar inflation.¹⁶

Also during this time period the bottled nickel Coke became a standard size. When the parent bottler split in 1900, Whitehead's Southern company chose to utilize a 6 oz. bottle. Thomas' Northern company opted for an 8 oz. bottle. Clearly, as both sold for 5¢, this was effective price discrimination between customers in the hot South and those in the colder North. (Coca-Cola was then still perceived as mainly a summertime weather drink.) In 1916 this price discrimination ended and a standard 6.5 oz. "hobbleskirt" bottle was adopted nationwide.¹⁷

In 1920, Prohibition was enacted. The Coca-Cola Company advertised its product as the "Great National Temperance Beverage." However, in the same year the Company made a terrible miscalculation when a sugar shortage caused the price of sugar on the world market to reach a record high of 28¢ per lb. Charles Howard Candler, Coca-Cola's then president, negotiated contracts with several large importers and refineries to ensure delivery of 4,100 tons of Java sugar at 20¢ per pound. That summer the sugar market collapsed and the price tumbled to 10¢ per lb., and then 9¢ by December. The Company was then dedicated to buying \$8 million of sugar that was worth half that on world markets (Landers, 1950). By 1921, Coca-Cola had warehouses full of contracted sugar while the price was 3¢ per lb (*Fortune*, 1951).

¹⁵ Along with lawyers' fees, the Coca-Cola Company hired a psychologist from Barnard College—Harry Hollingworth—to conduct research on the behavioral effects of caffeine on humans. According to Benjamin, et al. (1991, p. 43), "The exact sum of the contract is not known although it must have been a substantial amount [having afterwards] funded [Hollingworth] as director of the studies and Leta [his wife] as assistant director, and [paid for] all of Leta's graduate school expenses." The study "set a standard for psychopharmacological research" (p. 42).

¹⁶ Directly following WWI, there were a few incidents of some retailers charging 6¢ and 7¢ for a Coke. Also, some bottlers, against their agreement with the Coca-Cola Company, perverted the syrup with sugar substitutes. *Coca-Cola Bottler*, "Sugar Substitutes," June 1918; *Coca-Cola Bottler*, "The Use of Saccharin," September 1918; and *Coca Cola Bottler*, "Sugar and Its Substitutes," December 1918. These episodes, however, were isolated.

¹⁷ When the design was submitted by a plant manager, Alex Samuelson, from a bottle supplier, it was dubbed the "hobbleskirt" or "Mae West" bottle due to its curves which were perceived as feminine. Interestingly, the bottle was supposed to be modeled to look like either a coca leaf or a kola nut but, due to Samuelson's and Clyde Edwards' (another employee) mix-up with an *Encyclopedia Britannica*, it ended up modeled after the seed pod of a cacao tree, the source of chocolate (Allen, 1994, p. 112).

To make matters worse, the Coca-Cola Company and its parent bottlers found themselves in legal conflict. In March 1920, the Company announced that it would terminate its contract with the parent bottlers on May 1. The Company was losing \$29,000 (\$213,235 in 1992 \$s) a day due to the inability to raise the syrup price.¹⁸ The parent bottlers obtained a temporary injunction blocking this action. A temporary solution was reached allowing the Company to sell syrup at \$1.72 per gallon with a floating adjustment (a form of indexation) for sugar price changes (Pendergrast, 1993, p. 140). However, in November the contract was ruled permanent in court.¹⁹

Realizing that a bankrupt Coca-Cola Company was in no one's interests, a more lasting agreement was reached. Beginning November 1, 1921, the Coca-Cola Company charged \$1.17 per gallon for syrup to parent bottlers, who then sold it to bottlers at \$1.30 per gallon; and, for every cent that the price of a lb. of sugar increased in excess of 7¢, the syrup price would increase by 6¢ (Pendergrast, 1943, p. 144). Starting in 1923, when Robert W. Woodruff became president of the Company, a more direct solution to contractual disagreements was pursued: the buying of failing bottlers. By 1940 the Company would own 25 bottling plants (Pendergrast, 1943, p. 170).

During the Great Depression the Coca-Cola Company witnessed changes in both market conditions and technology. Of course, the Depression was a negative demand shock. On top of that, a certain soft drink company, named Pepsi Cola, began to market a 12 oz. bottle for 5¢ in 1934. During this time we observe the Company resisting downward price pressure in the face of direct competition from a new competitor and the general deflation of the era (see **Figure 2**).²⁰ As well, in 1933 prohibition was repealed. If anything this was a negative shock to Coca-Cola demand.

Among Depression-era technological changes, the refrigerator became commonplace in households and sales of 6-packs to housewives during their grocery shopping trips became important. Related to this, a trend away from daily shopping to staggered trips to the supermarkets once or twice a week was occurring as, according to a 1951 *Fortune* (1951, p. 131) article, "The corner neighborhood grocer [became] nearly a museum piece." By 1955 the take-home market constituted between 35 and

¹⁸ Sworn testimony by Howard Candler (*The Coca-Cola Bottling Company v. The Coca-Cola Company*, a & b).

¹⁹ The sugar situation was so dire that fountain Cokes in Atlanta temporarily rose to 8¢ (*Atlanta Constitution*, 1920). Interestingly, despite the fact that this occurred in the Coca-Cola Company's home, the incident was isolated to Atlanta.

²⁰ Worthy of note is the negative stigma that was, at that time, placed on price-cutting in the retail drug industry, the major outlet of fountain sales, and the food industry, a major outlet of bottle sales. In *The Red Barrel*, a magazine published by the Coca-Cola Company, Harvey Henry, chairman of the National Association of Retail Druggists, and Fred Griffiths, president of the Pennsylvania Drug Company, contributed articles condemning price competition (Henry (1933) and Griffiths (1934)). As early as 1929 the Federal Trade Commission (FTC) issued a statement condemning competitive price-cutting. Riley, *Organization*, p. 134. Also in *The Red Barrel*, Paul Willis, president of the Associated Grocery Manufacturers of America, advocated an end to price-cutting and a focus on profit through volume (Willis, 2000). Furthermore, price-cutting by Pepsi and other soft drink companies moved the American Association of Carbonated Bottled Beverages to issue monographs on responsible "cost practices;" and more generally, as early as 1929 the Federal Trade Commission (FTC) issued a statement condemning competitive price-cutting (Riley, 1942, p. 134).

52 percent of bottle sales depending on the area (*Businessweek*, 1955).²¹

Also, 1936–1937 saw the introduction of coin-operated coolers (the earliest soft drink vending machines). Red Coca-Cola coolers were already a familiar sight in grocery stores. In 1936 the Vendo Company in Kansas City was formed to market vending tops for the coolers (Schreiber, 1961, p. 42).

As can be seen in **Table 1**, gallon sales were hit hard by the Depression but, post 1933, had a strong recovery relative to the general economy and managed positive sales growth as the economy experienced the "Roosevelt Recession" in 1937–1938.²² Interestingly, this strength may have been aided by Franklin Roosevelt who made more nickels available to consumers during the 1930s. *Fortune* (1951, p. 129) noted that, in response, "Coca-Cola and the soft-drink business really spurted." In any case, bottlers and parent bottlers did not share in the robustness and many went bankrupt. As noted above, Coca-Cola pursued the purchase of these bankrupt bottlers. By that time, there were 6 parent bottlers and, by Depression's end, Coca-Cola owned all but one of them (Pendergrast, 1993, p. 186).

WWII again witnessed consumers becoming soldiers and leaving the country. Again sugar rationing was enacted. At the worst point, producers were rationed 50 percent of their prewar levels (Pendergrast, 1993, p. 201). Riley (1942, p. 86) describes how, for soft drink producers, "Shortages of crowns, sugar, bottles, cases, gasoline, trucks, equipment, manpower, and virtually everything else required for production and business operation were problems of everyday occurrence." Furthermore, despite these conditions, the Coca-Cola Company chose to fulfill a promise from Woodruff: Coca-Cola would be available to every member of the armed forces for 5¢ no matter where they were stationed (Kahn, 1969, p. 84; and Jackson, 1944). The US government lent a hand, making sugar available without limit for syrup to be sold to the military.²³ Besides overseas operations for soldiers, the Company also served training camps across the US. For these soldiers Coca-Cola not only sold for 5¢, but the Company *also sold nickels (at cost) to the soldiers!* (*Coca-Cola Bottler*, January 1944).

Postwar inflation began a building pressure on the nickel Coke. By the late 1940s, with nominal production costs soaring, a handful of bottlers began charging 90¢ or \$1.00 per case to retailers, rather than the usual 80¢.²⁴ In response some affected retailers broke from the nickel. The 1950s would indeed mark the decade when the bell tolled for the nickel Coke. *Time* (1950b, p. 12) observed that, in 1950, "In New York City, bottled Coca-Cola broke loose from its nickel moorings and for the first time went to 6¢." However, as of 1950 only 125 of the 1,100 bottlers had initiated price increases to

²¹ There was a quantity discount with 6-packs for 25¢. This price was introduced circa 1939 and remained constant along with the 5¢ single bottle until the 1950s.

²² Indeed, a 1938 *Barron's* article marveled that, "You could have bought Coca-Cola stock at the top price of 154 ½ in 1929, . . . sold it at the low this year and you would have had, including dividends, a profit of . . . 225%" (Tedlow, 1990, p. 85).

²³ Office of Production Management, Order M-55.

²⁴ The Coca-Cola Company, *Fact Sheet*.

retailers. In 1951, Coca-Cola dropped the placing of "5¢" in its advertising material.²⁵ By 1955, *Businessweek* (1955, p. 44) reported that a "bottle of Coke today sells for 6¢, 7¢ or even 10¢ depending on the area." As well, the Coca-Cola Company was introducing, for the first time, various bottle sizes at various prices. By 1959 the last of the 6.5 oz. nickel cokes were gone.

QUALITY RIGIDITY

During the nearly over-60 year nominal price rigidity, Coca-Cola exhibited almost equally enduring quality rigidity. Documenting this quality rigidity is important for two reasons. First, one reason that nominal price rigidity may not imply inefficiency is that quality adjustments can be substitutes for price adjustments. Second, we argue below that quality was, along with price, an important component of the Coca-Cola Company's implicit contract with consumers.

Schaeffer and Bateman (1985) document six changes in the Secret Formula from 1886 to 1960. The first change was made in 1889 by Asa Candler, then owner and president of the Coca-Cola Company. After acquiring the Company, Asa and his business partner, Frank Robinson, added glycerin as a preservative. The Company had been swamped with complaints that the syrup turned rancid in storage. For the same reason, by "adding essential ingredients and by taking others out of the Pemberton formula" they insured that all of the ingredients were more "compatible" with one another, i.e., the syrup did not turn rancid over time (Candler, 1950 and 1952). Since the old Coca-Cola syrup was perishable, in order to serve an identical product to a larger market this Formula change was necessary and could not be substituted for with a price adjustment.

The second change documented by Schaeffer and Bateman has to do with fountain syrup versus bottle syrup. In 1899, the Coca-Cola Company decided to prepare two different syrups for the respective purposes.²⁶ The change was designed to ensure that bottled Coca-Cola (for which the rights had just been sold to Thomas and Whitehead) had an identical taste to fountain Coca-Cola. Since this Formula change was carried out to ensure identical quality in different settings, it could not be substituted for with a price change.

The federal government's effort to impose a stamp tax on Coca-Cola as a medicine in 1898 was the impetus for the third Secret Formula change documented by Schaeffer and Bateman. Though Coca-Cola sued the government and eventually recovered taxes paid, during the litigation the issue of cocaine

²⁵ When the nickel price became untenable, Woodruff got his friend, President Dwight D. Eisenhower, to petition the US Treasury to issue a 7.5¢ coin. The US treasury apparently had "strong objections" to this (Kahn, 1969, p. 133).

²⁶ Specifically, the bottled syrup had more sugar, caramel, citric acid and phosphoric acid; and less water and caffeine.

arose. Asa Candler had to admit under oath that Coca-Cola contained a "very small trace of it."²⁷ The Coca-Cola Company contracted Schaeffer Alkaloidal Works to "de-cocainize" the Secret Formula's "Merchandise No. 5" (Schaeffer and Bateman (1985) and Gootenberg (2004)). This change is best viewed as exogenously imposed by the pressure of US regulators and courts. No price change could effectively substitute for it.

The fourth change documented by Schaeffer and Bateman involved different types of sugar. The Coca-Cola Company had been using "confectioner's A"-grade sugar, which is a powdered, rather than granulated, form. Because of its powdered form, confectioner's A carried moisture with it, which caused a tendency for the sugar to "sour because this moisture carried impurities with and allowed the sugar to retain them" (Candler, 1950). The Company's sugar refiners had repeatedly urged Asa Candler to change to granulated sugar, but Candler steadfastly refused. He finally agreed in 1904 (Schaeffer and Bateman, 1985). Since we can find no evidence of consumers detecting a change in the taste, the two types of sugar are best thought of as perfect substitutes in the Coca-Cola production process. Again, no price change appears able to have substituted for the change.

In 1918, government was again the impetus of a Secret Formula change. The fifth change documented by Schaeffer and Bateman resulted from the US Department of Agriculture's 1909 lawsuit against the Coca-Cola Company under the PFDA. There were two main charges. First, Coca-Cola was "misbranded" because its name promised coca and kola while it contained little of either. Second, it was "adulterated" by the presence of caffeine.²⁸ On April 20th, 1918, the Company agreed to a settlement whereby it would reduce the caffeine content of Coca-Cola by almost two thirds (Schaeffer and Bateman, 1985). Again this change was exogenously imposed and the Company could not have substituted a price change.

To help avoid what occurred after the disastrous stockpiling of 28¢ per lb. sugar in 1920, the Coca-Cola Company developed a form of syrup with considerably less sugar in it than regular syrup. This concentrate could then be used in any production plant worldwide by simply adding sugar (Schaeffer and Bateman, 1985). A problem with this was that cane sugar—the only type used in Coca-Cola up until then—could be produced only in tropical and sub-tropical regions and, therefore, it was impossible to guarantee a continuous supply of it to other regions of the world. The Company hired a German scientist—an expert in sugar development—who, along with Company chemists, developed a beet sugar that did not compromise the quality of the drink and constituted the sixth Formula change documented by Schaeffer and Bateman. Beets could be grown in more regions and, therefore, beet

²⁷ *Rucker v. The Coca-Cola Company*.

²⁸ *United States v. Forty Barrels and Twenty Kegs of Coca-Cola*.

sugar was easier to maintain a continuous supply of. Again, since we can find no evidence of consumers detecting a change in the taste, the two types of sugar are best thought of as perfect substitutes in the production process.

We were able to find an additional episode of a change in the Secret Formula. This was a temporary change and it happened in 1942 when WWII sugar rationing created a substantial shortage of Coca-Cola for civilian consumption. Robert Woodruff reluctantly agreed to use a sugar substitute—most likely saccharine—in part with rationed sugar, but stated: "I am very leery about these things and much prefer not to do anything of the kind, except as a *matter of life and death*."²⁹ Additionally, there was a shortage of caffeine. The Company's inventory was down to less than a month's supply and the price shot up from \$1.50 per lb. to more than \$7.50 per lb.³⁰ Coca leaves were also in short supply. Woodruff approved a temporary cutback in the amount of caffeine and also coca leaves used in production of Merchandise No. 5. Since sugar rationing was exogenously imposed, the use of sugar substitute could not be replaced with a price change. However, the extent to which a price change would have substituted for the reductions in caffeine and coca is less clear.

It is noteworthy that we are unable to find any evidence of any of these changes in the Secret Formula being perceived by the public. Furthermore, even if all seven of these Formula changes—temporary and otherwise—are interpreted as quality changes that substituted for price changes, from 1886 to 1959 we find 1 quality change per decade on average. However, we have argued that, in most cases, the changes were not voluntarily undertaken quality adjustments. Given the nominal price rigidity, exceptional quality rigidity is also part of the Coca-Cola history.

THE IMPLICIT CONTRACT

Extending the Invisible Handshake to Consumers

We argue that both the Coca-Cola's fixed nominal price and fixed quality were part of an incredibly strong implicit contract between the Coca-Cola Company and its consumers. What is remarkable about this implicit contract is that the Company made it *explicit* in the written guarantees and assurances of millions of print ads, displays, promotional giveaway items, etc. Moreover, assurances of quality and price were often included together. The guarantee of the price was explicit since the beginning; that of constant quality was more implicit at first, but later became explicit. Below we provide some of the numerous examples of these efforts by the Company. To provide an accurate

²⁹ Woodruff, Letter to Arthur Acklin.

³⁰ Hayes, Letter to Robert W. Woodruff.

view of the consumers' perspective, we present most of the material literally, simply quoting text.

Consider an 1898 ad in the *Atlanta Police Department Bulletin*. At the time Coca-Cola was only local to the Atlanta area and only sold at fountains. But, at whatever fountain one chose, the ad promised Coca-Cola at "5 cents per Glass". Also, besides claiming that it "Relieves Headache Immediately," the ad guaranteed the drink to be "Delicious! [and] Refreshing!" This was certainly not a *constant quality* guarantee, but it began a theme that would later evolve into such a guarantee.

In a 1903 *Atlanta Journal*, Coca-Cola's ad now touted that it was "At Soda Fountains and Carbonated in Bottles." In either case, it was still "5 CENTS". Moreover, again it promised to be "Delicious! [and] Refreshing!" An advertisement with the same promises appeared in a 1909 *Atlanta Constitution*. So, for over a decade, Atlanta consumers were promised delicious and refreshing Coca-Cola for 5¢ in either the bottle or at the fountain.

Coca-Cola did not remain local to Atlanta for long. A 1906 full-page *Cosmopolitan* ad brought the promise of a "5¢" price "AT ALL FOUNTS AND IN BOTTLES" for a drink that was both "DELICIOUS" and "REFRESHING" to the nation as a whole. Similar ads were run in *American Theater* and *Country Life in America* in 1906. That same year, and ironically given the court battles to follow, the Coca-Cola Company also ran ads stating that it was "GUARANTEED UNDER THE PURE FOOD AND DRUG ACT".³¹ Despite ensuing problems with Harvey Wiley and the PFDA, the theme of *guaranteeing purity* along with the 5¢ price would become a recurrent one.

In the early 1900s Coca-Cola was facing competition from a myriad of imitators shamelessly trying to ride the Coca-Cola coattails, e.g. Coke-Ola, Koca-Nola, Kokola, Toca-Cola, Kaw-Kola, Taka-Cola, and Roco-Cola (Allen, 1994, p. 73). By 1908 the Coca-Cola Company was stressing that Coca-Cola was "Delicious-Refreshing-Wholesome [and] Thirst-Quenching" and that consumers should make sure to "GET THE GENUINE" Coca-Cola. The above quotes are from the July 16th, 1908 issue of *Life* and the ad also guaranteed that Coca-Cola was "5c. Everywhere". Also, 1912 Coca-Cola ads warned "BEWARE!!! of Imitations" and encouraged consumers to "Demand the Genuine – Refuse Substitutes".³² The competition with imitators, along with the guarantee of purity, would complement each other in the theme of constant quality that evolved into Coca-Cola's advertising.

The 1920s continued the theme of "Delicious and Refreshing" at "5¢," as in a full-page ad in a 1922 issue of *The Ladies Home Journal*. The 1930s continued that theme and that of purity. Coca-Cola is a "drink of natural flavors" that is "PURE AS SUNLIGHT", ran a 1932 *Emory Alumnus* ad. As well,

³¹ The Coca-Cola Company, "Guaranteed."

³² Advertising Copy Collection, 00349 ARS.

the 1930s witnessed the introduction of the famous "pause that refreshes" slogan.³³ The "pause", at this point, had been part of consumers' lives for over 50 years and was "the best friend thirst ever had."

In 1941 issues of *National Geographic*, *Boys' Life*, *Collier's*, *Life*, *Time*, and the *Saturday Evening Post*, the "pause that refreshes" was still promised at "5¢," but now there was an additional claim: "You trust its quality."³⁴ And in a 1942 *Saturday Evening Post* the "5¢" "Delicious and Refreshing" Coca-Cola stated that "Quality carries on." The guarantee of quality was prominent and the "carries on" implied a constancy that could be depended on over time. By 1945, during WWII sugar shortages and the resulting sugar rationing, the Coca-Cola Company evoked this guarantee to explain Coca-Cola shortages to civilian consumers. "Where's all the Coke gone, anyway?" asked one ad:

[T]he answer is: there's a world-wide sugar shortage, caused by world-wide disorder and confusion that goes along with war. Sugar shortage means Coke shortage because *Coca-Cola never compromises on quality*. Today, yesterday, tomorrow—Coca-Cola means Coca-Cola, *the same quality as always* [our emphasis].³⁵

Another ad featured a neighborhood store clerk telling consumers, "Sorry, but we're short on Coke today."³⁶ Consumers are encouraged not to blame the clerk because, again, the sugar is being rationed and "there's one thing you can always be sure of—the Coke you get is the real thing [and] *the same quality you have always known* [our emphasis]." Both ads, of course, still promised Coca-Cola for "5¢", but now the guarantee of constant quality is explicit.

Along with these print ads, the Coca-Cola Company provided various promotional items, most of which featured the "5¢" guarantee. **Table 2** presents the tallies of different promotional items for a single year, 1913, as a snapshot of how Coca-Cola blanketed the nation with its idea of the nickel Coke.

The prominent "5¢" guarantee finally departed from Coca-Cola ads in 1951. For the first time in 65 years, the familiar "pause that refreshes" was not guaranteed to consumers for a nickel.

Informing and Convincing Retailers

65 years is an exceptional period of constant price and quality guarantee to consumers. Of course, one may suspect that the advertisements are, in and of themselves, flimsy evidence of an economically important implicit contract. (Should economists declare an implicit contract every time a used-car salesman shouts, "No one beats our prices!"?) However, in this case the promises of the contract of constant quality and price were delivered (as documented above). Furthermore, we now

³³ E.g. *Nation's Business* (1938).

³⁴ Advertising Copy Collection, 01625 ARS.

³⁵ Advertisement No. S-3.

document the Coca-Cola Company's efforts to inform retailers that an implicit contract existed with consumers, and that it was in their common interest not to break its conditions. In many instances, this evidence is more explicit in detail than the ads aimed at consumers.

In a 1916 *Drug Trade Journal* insert, when WWI had caused syrup ingredient prices to rise, the Coca-Cola Company stated:

Some said: "Raise the price to the retailer." Some said: "Lower the quality." Some said: "Cut the advertising appropriation." That is the summary of the advice we have received . . . from people who new how greatly our cost . . . has been advanced. . . . We said: "Price, quality and advertising will remain the same." [W]e would be mighty poor specimens if we tried to make the druggist carry the load of our increased costs. . . . The burden is ours—we have gladly assumed it. . . . [W]e are determined to make it a fat year from the standpoint of keeping faith with dealers and the public. All we ask of dealers is the *natural and human* reciprocity of serving only the genuine and serving it properly.³⁷

The constant price and quality guarantee was made explicitly above to retailers. Presumably, in asking for retailers to "serve it properly," the Company referred to 6.5 oz. at 5¢ and using unadulterated syrup.

By 1920s the Coca-Cola Company was using inserts in trade journals to encourage the standard 6.5 oz. size and 5¢ price as something expected by consumers and profitable to retailers. "This Glass increases sales", stated a 1923 insert referring to 6.5 oz. glasses that could be "bought in quantity from your jobber." The insert also referred to "The Right Price" of "5¢" which "is *the price people expect to pay* for Coca-Cola, because it is *established by years of custom* [our emphasis]." As well, "it gives you [the retailer] a good profit on every sale, but it gives you most profit by giving you more sales [and it's] the price that keeps your cash register ringing, and that's the music that builds business."³⁸

In 1925 the Coca-Cola Company issued a series of bulletins under the title of *Reviewing "A Proud History" 1886 to 1925* to regional managers, regional outdoor advertising managers, branch managers, district sales managers, salesmen, the service section, sign painters and decorators of the Company. Each and every page included, in the lower margin, an underlying theme to convey to retailers: "Use the Retailer's figures to show him the profit on Coca-Cola [and] Show him how to push sales to increase the profit on Coca-Cola." Retailers needed to know that "It is not the 5¢ so much as it is the 2,400,000,000 drinks per year. . . . It is this volume which enables us to offer the public, at a nickel, an absolutely pure soft drink" (p. 1900).

By the 1940s the efforts to convince retailers of the profitability of Coca-Cola at 5¢ became even

³⁶ Advertisement No. S-2.

³⁷ Advertising Copy Collection, 00502 ARS.

more pronounced. "LOOK AT IT THIS WAY" requested a 1942 insert featuring a magnifying glass focused on a nickel:

Coca-Cola magnifies the nickel to real importance in your store. When you look at Coca-Cola in terms of what you sell in a year, you see a *big* profit from a 5¢ sale. On the sale of a case a day your gross profit is \$125.00 a year. How's that for magnifying the value of a nickel?

Concerning quality, another 1942 insert declares, "There's a seven-letter word for it":

QUALITY . . . the quality of genuine goodness. That's what your customers recognize in Coca-Cola. . . . 5¢ You trust its quality.³⁹

Yet another 1942 insert states the Coca-Cola Company's guarantee to consumers—"Quality carries on . . . 5¢"—and then makes a guarantee to retailers:

We make this pledge to YOU[.] In national magazines, in newspapers, on posters, and over the radio, we're telling the world that the unmatched *quality of Coca-Cola remains the same* even though the quantity is limited by Government order.⁴⁰

Considering the "5¢" in print, this insert may be viewed also as a veiled warning to retailers not to charge more as a type of retail price maintenance.⁴¹

As late as 1950 an insert in *Food World* touted the explicit pledge: "Continuous Quality" and "Continuous Price".⁴² The quality would be continuous until 1985 with the introduction of "New Coke" (and even then the Secret Formula would be soon reintroduced with "Coca-Cola Classic"). The nickel price would, however, not endure past the 1950s.

The Coca-Cola Company's Belief in the Implicit Contract's Importance

The above documentation of the Coca-Cola Company's efforts to inform retailers of the implicit contract and to urge them to enforce it is evidence that the Company believed the implicit contract represented an economically important relationship with consumers. We can fortify such a view with a few pieces of direct evidence from internal Coca-Cola Company documents.

The 1924 annual report of the Coca-Cola Company—the first published during Robert Woodruff's presidency—states "All of our equipment might be replaced more easily than our goodwill, which has been cultivated through 38 years of consistent effort" (p. 4).

³⁸ Trade Paper Insert.

³⁹ Advertising Copy Collection, 01724 ARS.

⁴⁰ Advertising Copy Collection, "Chain Store Age."

⁴¹ The types of promotional items in **Table 2** can be considered retail price maintenance of the same type.

⁴² Advertising Copy Collection, 02815 ARS.

Over ten years later, in 1948, Woodruff received an editorial in the mail written, and published, by Duke Merritt of the Cartersville, Georgia *Daily Tribune*. Merritt wrote that the editorial was written "in appreciation of the fact that Coca-Cola is the one unchanged friend of childhood, still the same good taste at the same nickel price".⁴³ In the editorial, Merritt wrote that:

[W]ay back yonder, a loaf of bread was a nickel, soap was a nickel . . . and coffee and milk were a nickel each [and even] beer, was also five cents a glass then. . . Coca-Cola has changed neither its price nor its quality. . . Look what has happened to other five-cent items in Coca-Cola's nickel life time. Bread is 15 cents a loaf, in most places, soap is 10 and 15 cents a cake, coffee and milk each cost a dime . . . and beer is 30 cents, we hear. But our old friend Coca-Cola still remains the same, merely five cents.

Woodruff replied to Merritt: "Your comment regarding our product and our Company describes exactly what has been our desire. . ."

. . . In the recent era of rationing and the subsequent period of high—and rising—costs, the maintenance of the 5¢ price has not been devoid of difficulty, but the compensations that arise from doing so, as exemplified by your friendly remarks, are many and not the least of them is the *good will embodied in such expressions as these in your editorial* [our emphasis].

Cartersville, Georgia was not the only area of the country where such sentiments prevailed. In the December 28, 1947 *Sunday Booster* (Lincoln-Belmont area of Chicago), Leo Lerner wrote:

No doubt you have noticed the new look in the grocery stores? [*sic*] It's on the price tags. The day my wife sent me shopping . . . I asked the proprietor if there was anything else in the store [besides Coca-Cola] that had not risen in price. . . [H]e shook his head, melancholy as he could be. "Nope," said the grocer. "Coke is the only thing in the whole place that hasn't gone up in price". . . I stuffed the groceries I bought for \$3 into my overcoat pocket and went out. On the way I tipped my hat to the Coca-Cola.

In Indiana, *The Lampmaker*, published by Local Union No. 663 UAW-CIO, praised Coca-Cola in 1946:

The Coca Cola Company [*sic*] . . . has notified its salesmen that regardless of the price of sugar it will maintain its price to retailers so that the coke [*sic*] can be sold by the retailer at five cents per bottler. . . Coca Cola, indeed, is the pause that refreshes in a Big Business world that has gone hog-wild for higher and higher prices. It's still Coca Cola—5¢.

And an editorial from a 1946 *Worthington Globe* (Worthington, Minnesota) lashed out at individual retailers that deviated from the 5¢ standard:

⁴³ Robert W. Woodruff Papers, Coll. 10, Box 124.

[S]ome local firms have selected for a price upping the very commodity that will discredit all these reassuring words and action – the lowly "Coke". . . [Here] come a bunch of local pirates before the clods are dry on OPA's grave, who would take Coca-Cola out of the mouths of ordinary common people and make a dime drink of it—nectar for blue bloods to drink. And this without a cent increase in the wholesale price. Fie on them! May their cash registers tarnish in a pause that will refresh their memories of a mutual pledge taken to 'hold the line' and combat inflation!

The Coca-Cola Company preserved copies of these editorials and articles in their archives.

A few years after the above testaments appeared in print, internal Company documents express the Company's dedication to the 5¢ policy, even as inflation was fast making it untenable. E.g., in 1950 the Company distributed to bottlers a document called "Profit and Price Promotion" which stated:

[T]raditional prices of 5¢, 25¢ and \$1.00 [per bottle, per 6-pack and per case respectively]—consistently maintained through years and throughout most of the country—have been another of the foundation stones of the Coca-Cola industry . . . (pp. 2–3).⁴⁴

Also in 1950, H.B. Nicholson, a vice president at the New York offices of the Company, wrote a letter to a counterpart in Atlanta elaborating on the "Price and Profit Program":

[This program] has largely to do with the maintenance of the traditional 5¢ retail price on the part of the dealers. The purpose of this campaign is to revitalize the profit story to dealers and to put in the hands of Coca-Cola salesmen merchandising tools which will help them re-tell over and over again the profit story to the dealer.⁴⁵

And in a "Letter to Bottlers on Price" the Company estimated Coca-Cola's retail price elasticity in the neighborhood of a nickel: "Where the price of Coca-Cola goes from 5¢ to 10¢ the loss in volume has been as high as 58 percent" (p. 5).⁴⁶ Whether an elasticity around one half is "large" on some objective basis is unimportant. The amount of effort expended by the Coca-Cola Company to maintain the nickel Coke implies that it subjectively judged it to be large.

Concern for the 5¢ policy in Coca-Cola Company documents extended to fountain sales.⁴⁷

Overall, numerous—much more so than listed above—memos, letters and documents discussing methods of 5¢ price maintenance circulated within the Coca-Cola Company and were sent between the

⁴⁴ Coca-Cola 6-packs appeared circa 1939. It is unclear as to when cases of Coca-Cola appeared for sale at \$1.00 as "Profit and Price Promotion" document is the only mention of retail case sales that we were able to locate. In all cases the bottles were 6.5 ounces. Different sizes were not marketed until 1955.

⁴⁵ Nicholson, Letter to Pope F. Brock.

⁴⁶ A traditional Keynesian belief has been that prices are more flexible up than down. Interestingly, while no justification is given, the letter claims that "It is easy to increase your price, but it may not be easy to reduce. In fact, the consequence of increasing prices may make future reductions *impossible*" (p. 7) (our emphasis).

Company and its bottlers. Notably, not one of these methods proposed an alteration of the Coca-Cola syrup or the serving size.

World War II: the Handshake Extends across the Globe

Perhaps the most dramatic and tangible evidence of the Coca-Cola Company's valuation of the implicit contract is the guarantee that the Company extended, and fulfilled at considerable cost, to the US military in WWII. As described above, Woodruff made a pledge: Coca-Cola would be available to every member of the armed forces for 5¢ no matter where they were stationed. Ben Oehlert, a Coca-Cola lawyer in charge of diplomatic efforts at establishing operations overseas, urged on Woodruff in his plans claiming that the resultant goodwill would "carry through the lives of the young men now in the Army and through them will be reflected in generations to come" (Allen, 1994, p. 255).⁴⁸

During WWII, more than 5 billion bottles of Coca-Cola were delivered to armed service members. It all began with a June 29, 1943 top-secret cable from General Dwight Eisenhower, sent from Allied Headquarters in North Africa, asking for delivery of 10 bottling plants and enough syrup to provide his men with six million bottles of Coca-Cola a month.⁴⁹ In the end, a total of 64 bottling plants were shipped abroad and set up near combat areas.⁵⁰ For the Normandy invasion, Paul Bacon, Coca-Cola's chief technical observer (TO) in London asked for a requisition of 400,000 cases of Coca-Cola, 50,000 lbs of CO₂ gas, one and a half million bottle caps, 1,800 ice coolers, 1,000,000 gallons of syrup, and 5 bottling plants to be packed for amphibious landing. The quartermaster for the European Theater initially denied this request, but then supreme Allied commander Dwight Eisenhower ordered the requisition (Allen, pp. 260–261). In the Pacific Theater, cases of Coca-Cola were parachuted from AAF transport plains to soldiers below.⁵¹ Besides overseas operations to deliver Coca-Cola to US soldiers, the Company also served training camps across the US where it sold nickels, at cost, to soldiers.⁵² By the end of the war, the Company had borrowed \$5.5 million (\$45.9 million in 1992 \$s) to finance its efforts (Allen, 1994, p. 265). This was one of the smartest investments the company ever made: "After gulping down more than a billion servings of Coca-Cola, eleven million veterans were returning with a lifelong attachment to the soft drink" (Allen, 1994, p. 265).

How important to soldiers was this wartime promise by the Coca-Cola Company? Recalling his request from Allied Headquarters in North Africa, Eisenhower commented that he had taken "a survey

⁴⁷ E.g. Unsigned, Letter to F.E. Riggs. Riggs was regional sales manager for the Coca-Cola Company in Chicago.

⁴⁸ See Allen (1994, pp. 254–265) for a description of the war effort operations.

⁴⁹ Eisenhower, Top Secret Cable.

⁵⁰ *Always Coca-Cola*, p. 11.

⁵¹ *Coca-Cola Bottler*, "Coca-Cola Parachuted to Thirsty Troops," December 1944.

to see just what the men wanted and more of them voted for Coca-Cola than beer."⁵³ The most telling account of this importance is offered by a war correspondent, Howard Fast, who almost died as a result of a pilot's fear of not fulfilling a Coca-Cola-related order (Pendergrast (1993, p. 205) and Fast (1990, pp. 109–205)). Fast's transport plane landed at a remote Saudi Arabian Army outpost where the temperature was 157°F. They were there to collect thousands of empty Coke bottles. When their overloaded C46 failed to gain altitude, Fast suggested getting rid of the bottles. The pilot responded that dumping the bottles was not an option:

Guns they could dump, jeeps, ammo, even a howitzer... but Coca-Cola bottles? No way. Not if you wanted to keep your points and not become a PFC [Private First Class, the third lowest enlisted rank] again. . . . You don't [mess] with Coca-Cola.⁵⁴

QUANTITY ADJUSTMENT COSTS

The above evidence is largely descriptive, though we find it hard to argue that the Coca-Cola Company did not place a large value on its long-term constant price and quality relationship with its consumers. Still, one way to quantify a lower bound on the adjustment costs to price and quality is to quantify the costs of adjustment along the margin where adjustment *did* occur: quantity. Assuming that the Company adjusted along what was perceived to be the least costly margin, the costs of price and quality adjustment must be at least as high as those associated with quantity. We quantify one type of quantity adjustment costs in the form of advertising costs.

Advertising is usually thought of as serving the functions of conveying information about product features, signaling quality, and differentiating between products. Arguably all of these specific functions are subsumed in the general function of conveying information. However, for the Coca-Cola Company any advertising expenditure from 1886–1959 was an expenditure aimed at adjusting quantity. This conclusion follows from a simple assumption: profit maximization.

A firm can adjust profits by adjusting along the margins of price, quality and quantity, or combinations of those margins. Both Coca-Cola case price and quality were constant. Therefore, increasing profits could only be achieved through increasing quantity. Therefore, advertising expenditures were aimed at adjusting (upward) quantity.

Figure 3 demonstrates that Coca-Cola aggressively advertised from 1882–1944.⁵⁵ During this

⁵² *Coca-Cola Bottler*, "Thanks for Nickels!," January 1944.

⁵³ Eisenhower, Testimony.

⁵⁴ The word we left out of quote was not "mess." Indicative of soldiers' interest in Coca-Cola were the taunts of Tokyo Rose: "Wouldn't it be nice to have an ice-cold Coca-Cola! Can't you just hear the ice tinkling in your glass?" (Allen, 1994, p. 258).

⁵⁵ We could not obtain numbers through 1959.

time, advertising expenditures were in the range of 10 to 20 percent of revenue. As a lower bound for price adjustment costs these numbers are large. Zbaracki, et al. (2004) —using data from a large US-based industrial manufacturer and its customers—find that the cost of adjusting prices is 1.23 percent of revenue. Willis (2000), using Cecchetti's (1988) magazine price data, estimates price adjustment costs to be about 4 percent of revenue. Also, Slade (1998) finds a similar number concerning Saltine crackers in a retail supermarket industry. The Coca-Cola Company appears to have faced adjustment costs an order of magnitude greater than any documented in the literature. Importantly, quantity adjustment costs are estimates of the lower bound of price and quality adjustment costs, and advertising costs are only one type of quantity adjustment costs.

BREAKING THE QUALITY "CLAUSE": NEW COKE

Besides the fact that quantity adjustment costs only *imply a lower bound* of price and quality adjustment costs, there is also the issue that price and quality adjustment costs for Coca-Cola were not limited to those associated with the implicit contract. (E.g. our previous (2004) paper deals with price adjustment costs associated with vending machine replacement/modification and consumer inconvenience costs associated with abandoning a single coin price.) Before concluding this paper, therefore, we discuss a particular episode where costs of breaking the implicit contract are, at least qualitatively, directly observed.

The episode occurred nearly three decades after the last of the nickel Cokes had disappeared. The 5¢ price had phased out over the 1950s and consumers probably were unclear about how to partition accountability amongst the Coca-Cola Company, its bottlers, and retailers. However, on April 23, 1985—a single date—the quality "clause" of the implicit contract was broken by the Coca-Cola Company alone. New Coke was introduced to the American public.

Research on changing the Secret Formula began in the early 1980s as Coca-Cola's market share was declining and Pepsi Cola's was rising. A large number of blind taste tests revealed that consumers preferred Pepsi by margins as high as 15 points. Coca-Cola Company chemists began experimenting with changes to the Secret Formula. After a \$4 million (\$5.7 million in 1992 \$s) investment in an exhaustive battery of 190,000 blind taste tests, a modified formula was beating Pepsi by 6 to 8 points.⁵⁶

However, New Coke was instantly hated by the vast majority of US consumers. Bottler's

⁵⁶ These and other general facts below are drawn from Allen (1994, pp. 404–415) and Pendergrast (1993, pp. 354–371). There were several differences between the Old Coke and the New Coke. The biggest difference was that the New Coke contained less phosphoric acid, more citric acid, and more sugar, increasing the drink's sweetness. Other changes included adjustments in the amounts of caramel, caffeine, and vanilla, and the elimination of Merchandise No. 5 containing the extract

incurred a direct loss of \$30 million (\$38.2 million in 1992 \$s) in the form of unsold New Coke inventories (*Atlanta Journal and Constitution*, 1995). The most important costs incurred, however, are hard to quantify yet are certainly larger than \$43.9 million. These costs were in terms of lost goodwill.

Within a week of New Coke's introduction, over 1,000 phone calls per day were being received by Coca-Cola headquarters expressing shock, anger and outrage. By the beginning of June, the calls were up to 8,000 a day. In addition, 40,000 letters of protest were received. Consider quotations from some of the letters, collected by Pendergrast (1993, pp. 363–364):

Changing Coke is like breaking the American dream, like not selling hot dogs at a ball game.

I have purchased at least two cartons of Coke a week for as long as I can remember. . . My "reward" for this loyalty is having the rug pulled out from under me.

Millions of dollars worth of advertising cannot overcome years of conditioning. Or in my case, generations. The old Coke is in the blood.

Would it be right to rewrite the Constitution? The Bible? To me, changing the Coke formula is of such a serious nature.

My dearest Coke: You have betrayed me.

The most convincing evidence that these are not merely the exceptional instances is the exasperation of then-Coca-Cola Company president Roberto Goizueta's after monitoring the consumer hotline: "They talk as if Coca-Cola had just killed God."

Not three months had passed before the quality adjustment costs associated with breaking the quality clause of the implicit contract became unbearable. On July 11, 1985, the Coca-Cola Company announced the return of Coca-Cola *Classic*.⁵⁷

of coca and kola. Merchandise No. 7x, the super-secret blend of flavoring oils, was also modified. Given so many changes in the Secret Formula, it is clear that the drink has indeed undergone a substantial change in "quality."

⁵⁷ We have a partial information on one additional, much earlier episode which further underscores the Company's commitment to constant quality. This episode offers some information of the cost the Company chose to incur to *avoid* adjusting quality, and thus provides a measure of a lower bound on the quality adjustment cost. A shortage of coca leaves occurred in 1929, which was severely limiting the supply of "Merchandise No. 5," the ingredient containing the coca leaf and kola nut extracts. Narcotics laws in the US prohibited any importation of coca leaves. The exceptions were two companies, Maywood and Merk & Company, which were allowed to import them and manufacture cocaine for medical and scientific purposes. The Coca-Cola Company was buying the coca leaves extract from these companies, after the companies had filtered the cocaine out. Given the continuous increase in demand, by the end of the 1920s, the two companies were unable to manufacture enough coca leave extract to meet the Company's needs. The Company began lobbying in Washington, leading to the introduction of an amendment to the proposed 1930 Porter Bill, designed to further toughen US narcotics laws. The amendment, which "was plainly aimed at rescuing the Coca-Cola Company" (Allen, 1994, p. 195), ran into a roadblock, however. "But giving up would mean changing the secret formula, and that was unacceptable... Coca-Cola without the coca was unthinkable, even if the coca in question was a tiny dollop that was powdered, percolated, steamed, double-distilled, pasteurized, and otherwise exhausted until not one consumer in a million would have noticed its absence. The point was Coca-Cola's mystique, the cult of the formula. If word got out that the coca was gone, people *might think* [emphasis in original] they tasted a difference, and that could be ruinous" (Allen, *Secret Formula*, p. 196). In the end, both

CONCLUSIONS

We have documented the existence of a long-term, implicit contract between the Coca-Cola Company and its consumers—a contract that *explicitly* promised the unaltered "Secret Formula" at the constant price of 5¢. We have documented the development of this implicit contract in terms of the Coca-Cola Company's advertising to its consumers, communications to its bottlers, and own internal documentation.

This paper is a case study, albeit one of an exceptionally important corporation. However, we believe the importance of this case study goes beyond Coca-Cola for two reasons. First, existing evidence on implicit contracts is either from anonymous surveys or from experimental markets. This case study demonstrates a large, real firm explicitly expressing its belief in an implicit contract and also acting on that belief in the most explicit fashion. It is to our knowledge the only direct evidence of an implicit contract in an economically important product market.

Second, we believe that this evidence may call attention to other long-term fixed prices and implicit contracts from a similar time period. For example, Wrigley Company 5-stick packages of gum were 5¢ from 1893 until 1972.⁵⁸ KC Baking Powder was selling for a fixed price of 25¢ for over 50 years (Levy and Young, 2004). Also, Young and Blue (2005) study Sears Catalog price data from 1938–1951 and document three brand name items that did not change price once over the entire time period—Gillette "blue blade" razors (5 for 25¢), Tums tablets (36 for 25¢), and Bayer aspirin (100 for 59¢). Implicit contracts may be partly accountable for these types of long-term, consumer good prices. Taken together, such contracts may have contributed significantly to rigidity in aggregate pricing dynamics in the US.

houses of Congress gave quick approval to Coca-Cola's special exemption (provided that the Coca-Cola Company would destroy any cocaine and other byproduct alkaloids under the supervision of the newly established Bureau of Narcotics) and made it part of federal law, leading to a resumption of coca leaves steady supply. In his memo to Robert W. Woodruff (Ford, 1930), "... Harrison Jones [Coca-Cola Company's Vice President for Sales] calculated that the cost of manufacturing Merchandise No. 5 would be a bit higher now—\$1.11 a pound—because of new taxes and additional processing expenses. But he and Woodruff agreed the price was worth paying." While we do not know what it increased from, we know that the Company decided to incur this increased cost. Thus, the Company chose to incur a *permanently higher marginal cost* rather than incurring a *one-time fixed cost* in the form of changing the quality. Even if the increase in the marginal processing cost was small, this suggests that the perceived cost of adjusting quality must have been significant.

⁵⁸ Personal email correspondence with Anne M. Vela, Consumer Affairs Coordinator, Wm. Wrigley Jr. Company, February 1999.

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TABLE 1
GALLONS OF COCA-COLA SYRUP SOLD AND REAL GDP

Year	Gallons of Syrup (U.S.)	Percent Change	Real GDP (\$1992 Billion)	Percent Change
1928	23,226,092	–	894.2	–
1929	25,704,674	10.6	951.7	6.4
1930	26,322,820	2.4	862.1	–9.4
1931	25,101,423	–4.6	788.8	–8.5
1932	20,551,973	–18.1	682.9	–13.4
1933	19,376,587	–5.7	668.6	–2.1
1934	24,101,485	24.4	719.8	7.6
1935	27,482,431	14.0	778.2	8.1
1936	34,798,464	26.6	888.2	14.1
1937	40,652,790	16.9	932.5	5.0
1938	44,022,545	8.3	890.8	–4.5
1939	50,909,998	15.6	961.1	7.9

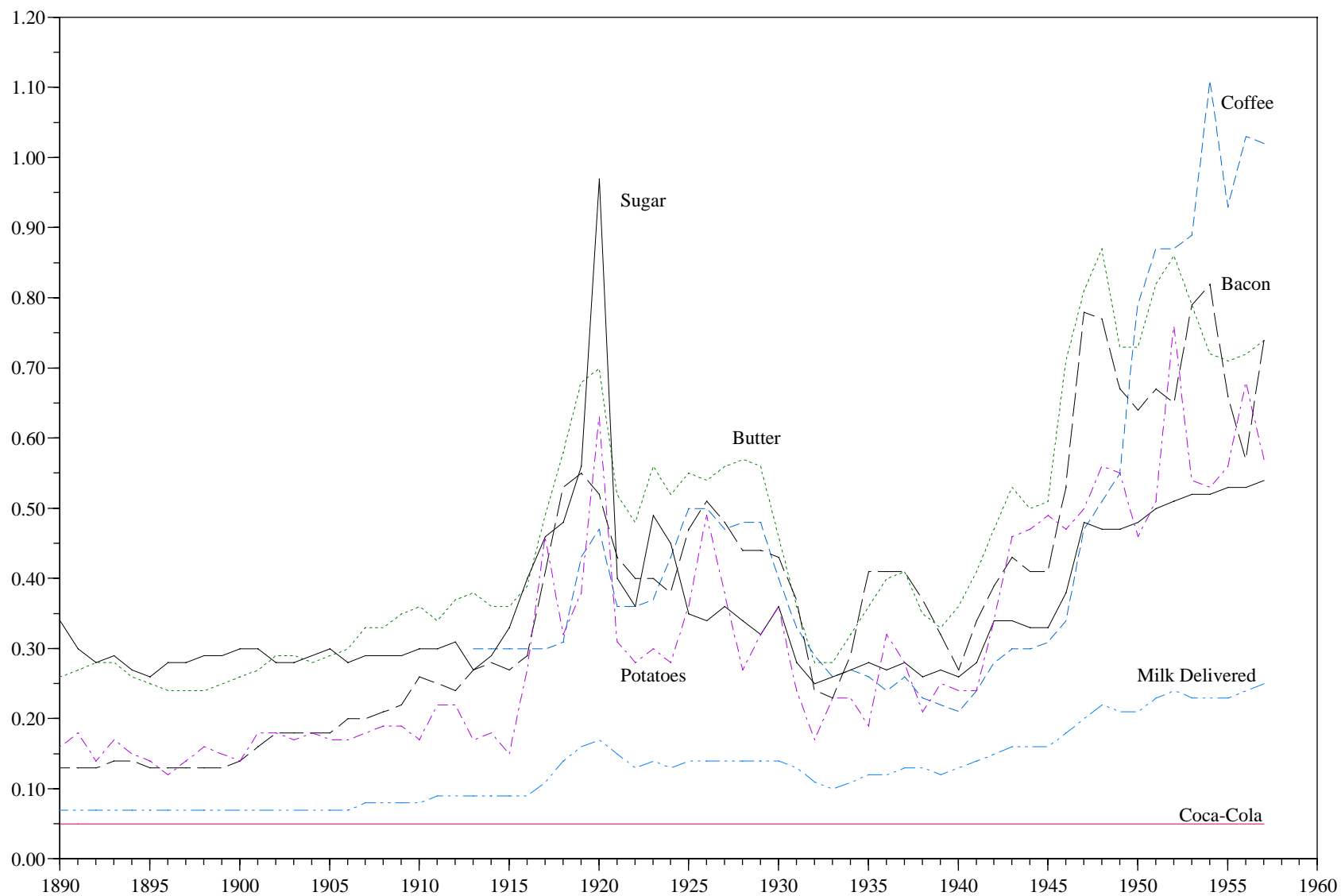
Sources: “Sales of Coca-Cola: Sales 1886 through 1939,” Coca-Cola Company, and Gordon (2000, Appendix A).

TABLE 2
ADVERTISING MATERIAL DISTRIBUTED BY THE COCA-COLA COMPANY IN 1913

200,000	4-head cutouts for window display
5,000,000	Lithograph metal signs from 6" X 10" to 5' X 8'
10,000	Enamel metal signs 12" X 36", 18" X 45"
60,000	Fountain festoons
250,000	Special signs for bottlers 12" X 36"
50,000	Cardboard cutouts for window display
60,000	4-head festoons for soda fountains
10,000	Lithograph metal display signs
20,000	Lithograph metal display containing reproduction of bottles
50,000	Metal signs for tacking under windows
200,000	Fiber signs for tacking on walls of refreshment stands
2,000,000	Trays for soda fountains
50,000	Window trims
250,000	5-head window displays and mirror decorations
1,000,000	Japanese fans
50,000	Christmas wreaths and bell decorations for fountains
50,000	The Coca-Cola Company song
1,000,000	Calendars
50,000	Thermometers
10,000,000	Match books
50,000,000	Doilies (paper)
	24-sheet posters for billboards 10' X 20'
	Oil-cloth signs for storefronts
10,000	Large calendars for business offices
144,000	Pencils
	Transparent signs for windows and transoms
20,000	Blotters
10,000	Framed metal signs for well displays
5,000	Transparent globes, mosaic art glasswork
	Art glass signs
25,000	Baseball score cards
	Celluloid display cards
\$300,000	Newspaper advertising
	Magazine, farm paper, trade paper, religious paper ads
	Other forms of advertising

Source: Tedlow (1990, Exhibit 2-1, p. 53).

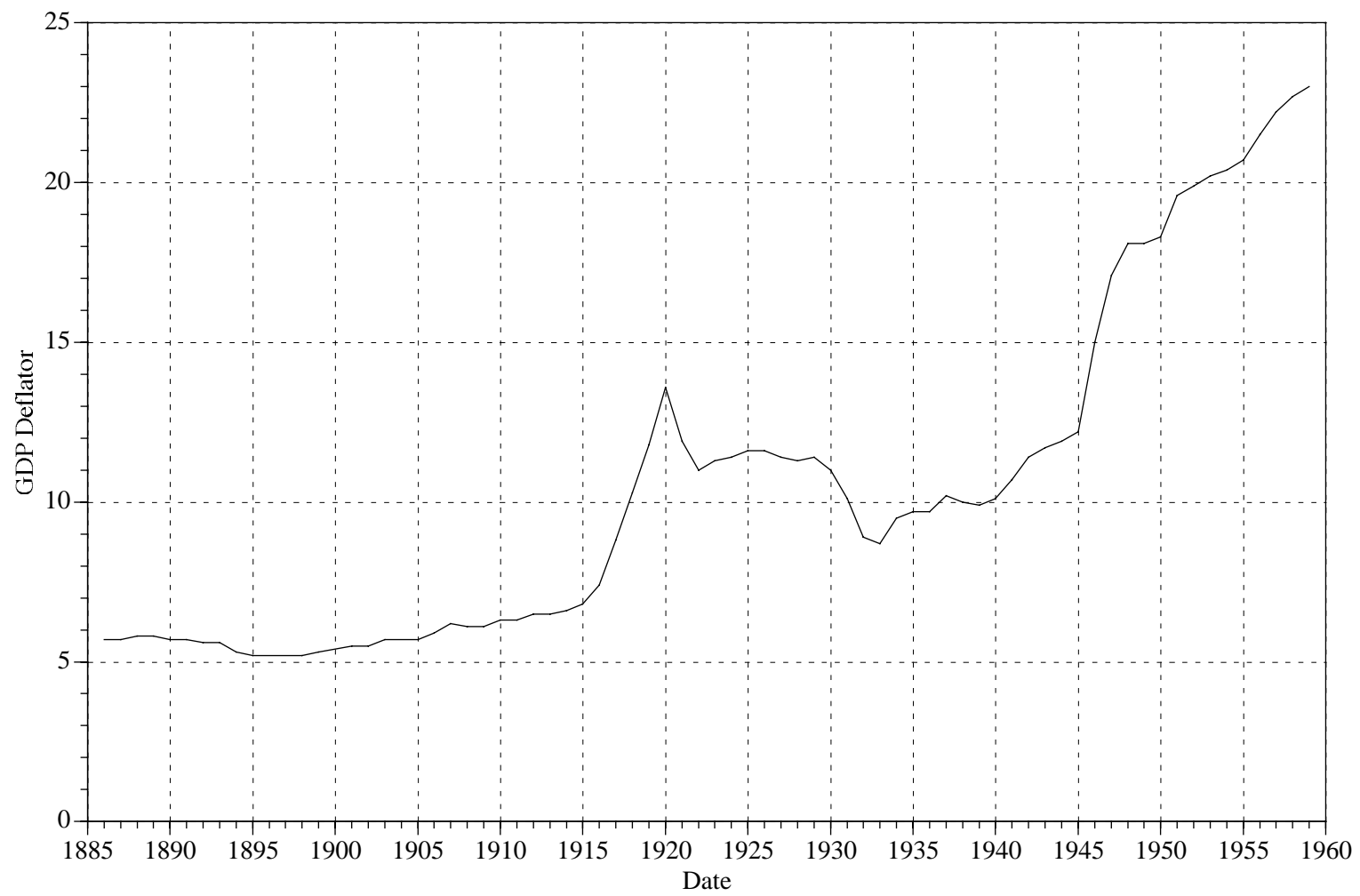
Figure 1. Retail Price of 6 1/2 oz Coca-Cola vs Retail Prices of Other Foodstuff, 1890–1957



Measurement Units: Coca-Cola (\$/6.5oz), Milk Delivered (\$/Qt), Coffee (\$/Lb), Butter (\$/Lb), Sugar (\$/Lb), Bacon (\$/Lb), and Potatoes (\$/10 Lb).

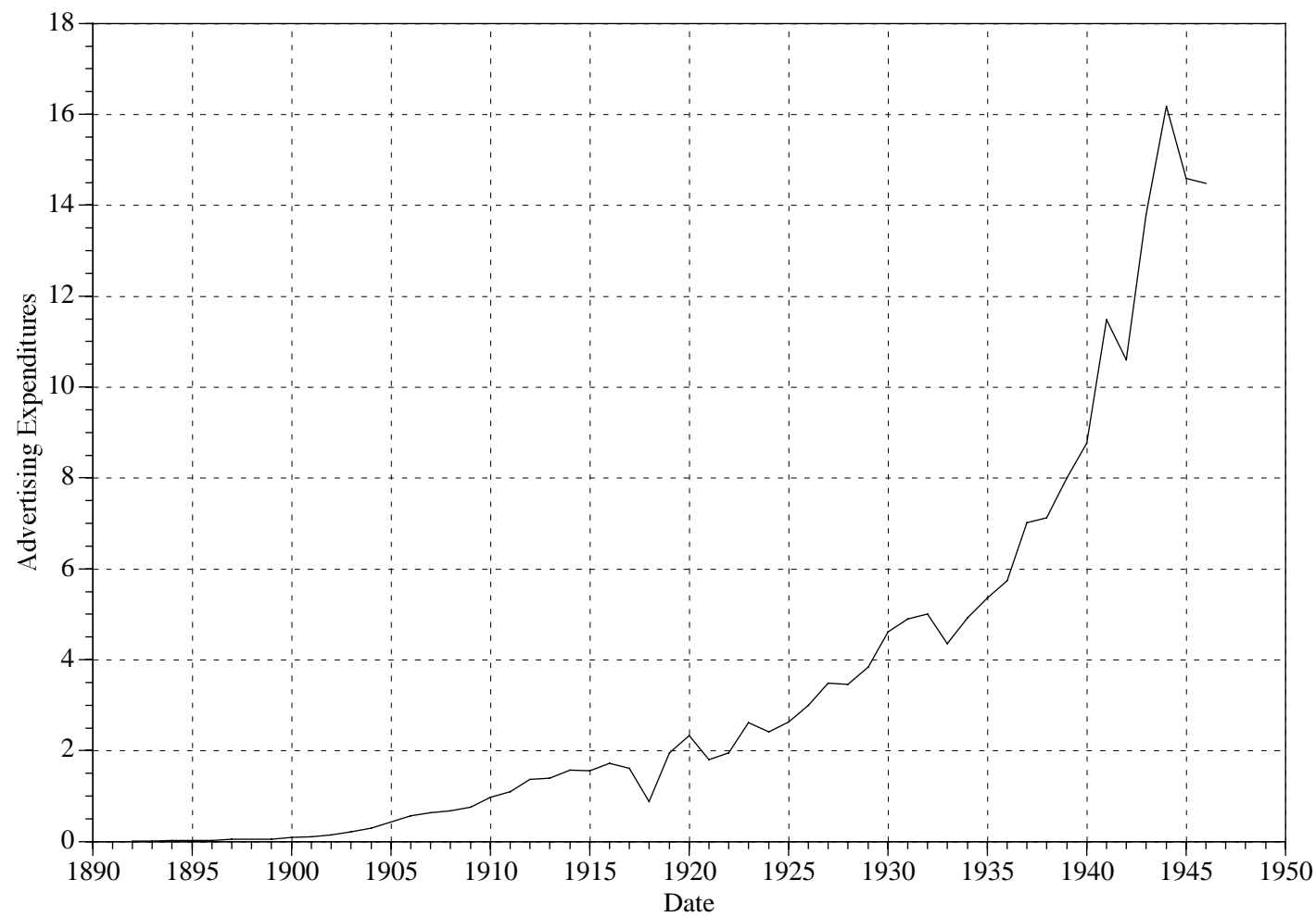
Source: *Historical Statistics of the United States: Colonial Times to 1970*, 1989 Edition.

Figure 2. GDP Deflator, 1886–1959 (1992 = 100)



Source: Gordon (2000), Appendix A.

Figure 3. Coca-Cola Advertising Expenditures, 1892–1946 (in millions of U.S. dollars)



Source: Internal Company Documents, Coca-Cola Company Archive, Atlanta, GA.